

Claims

1. The method to protect the airfoils of blades and vanes of gas turbine engines and steam turbine engines and components of steam turbine engines comprising the steps of:

- 5 i) cold working the surface of the airfoil and component to impart a residual compressive stress in the range of 5N to 20N;
- ii) cleansing the surface of the parts in step i).
- iii) coating the surface with a TiN of the parts in step ii) by a cathodic
- 10 arc deposition at temperatures in the range of from 300degrees to 350 degrees Fahrenheit to obtain layers of different hardness to a thickness of generally between 3 microns to 30 microns.

2. The method in claim 2 wherein the coating material can be taken essentially from chromium, nickel, vanadium or cobalt bearing alloys that may

15 have alloying elements such as aluminum, cobalt and nickel.

3. The method as claimed in claim 2 wherein the cold working consists

essentially of any of the processes of shot peening, ceramic peening, glass bead peening, and laser peening.

5 4. The method of repair of used blades or vanes of gas and steam turbine engines and components of steam turbine engines to protect against erosion, corrosion and fatigue comprising the steps of

- a. cleaning and/or de-greasing the used blades or vanes or components;
- b. inspecting the used blades or vanes or components from step 1);
- 10 c. cleaning and/or de-greasing the used blades or vanes or components;
- d. blending cracks, blemishes and other indications used blades or vanes or components;
- e. inspecting by fluorescent penetrants inspect used blades or vanes or
- 15 components;.
- f. cleaning and/or de-greasing used blades or vanes or components;
- g. cold working the surface of the airfoil of the blades or vanes or the surface of the component to impart a residual compressive stress in the range

of 5N to 20N;

h. cleaning the used blades or vanes or components;

i. coating the surface with a TiN of the parts in step ii) by a cathodic arc deposition at temperatures in the range of from 300degrees to 350 degrees Fahrenheit to obtain layers of different hardness to a thickness of generally between 3 microns to 30 microns;

j. inspecting the finished blade, vane or component.

5. The method of claim 4 wherein the inspection of the step of paragraph e. is done pursuant to ASTM E1417, Type 1 Method A to a sensitivity level 4 form a.

6. The method of claim 5 wherein the cold working in the step of paragraph g. is by ceramic bead peening pursuant to AMS 2430 using SAE AZB300-AZB425 ceramic shot to an intensity of 10N.

7. The method in claim 4 wherein the coating material can be taken essentially from chromium, nickel, vanadium or cobalt bearing alloys that may

have alloying elements such as aluminum, cobalt and nickel.

8. The method as claimed in claim 4 wherein the cold working consists essentially of any of the processes of shot peening, ceramic peening, glass
5 bead peening, and laser peening.